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AUTHOR Wilmore, Elaine L.
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ABSTRACT

This study addresses the factors of Graduate Record Examination scores (GRE), race, gender, and undergraduate grade point average (GPA) as predictors of principal certification examination success at a large urban university. The university has three programs that lead to a masters degree and principal certification. The regular program consists of students not in a cohort who complete programs on individual time tables. Another program, Scholars of Practice, consists of a cohort of students who retain their positions as teachers but are assisted by their school districts in containing supported internship experience over 18 months. The third program, Educational Leadership, consists of students selected by their districts to serve as paid administrative interns for a year. Whether there were significant differences in state principal examination scores for these groups and for the study variables was investigated for approximately 335 students in all 3 programs. Results show no significant relationships among the variables of GRE, GPA, sex, race, and ethnicity in the Scholars of Practice cohort. GRE is the only significant predictor in the regular program. However, in the field-based Educational Leadership program, all factors except undergraduate GPA were predictors of certification examination results. In addition, sex was more significant in this program than in the other two. Findings have implications for the development of principal certification preparation programs. (Contains 19 references.) (SLD)

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A Subgroup Analysis of Predictors to Certification Examination Success In Differing Principal Preparation Programs

Elaine L. Wilmore, Ph.D.
Special Assistant to the Dean – NCATE Accreditation
Associate Professor of Educational Leadership and Policy Studies

The University of Texas at Arlington

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A Subgroup Analysis of Predictors to Certification Examination Success in Differing Principal Preparation Programs

There is an increasing shortage of certified school administrators across the nation (Potter, 2001; Fenwick & Pierce, 2001; Erlandson, 2000; Steinberg, 2000; Richardson, 1999; Million, 1998; "Study Warns," 1998). Concurrently, many states are implementing difficult certification/licensure examinations. (Texas Administrative Code; Accountability System for Educator Preparation 19§241.01a, 1999). This is particularly true in Texas where the Examination for the Certification of Educators in Texas (ExCET) is required for anyone seeking initial or additional certifications in any field (TEC, sub.D: chap. 21.048a, TAC, subchap. M., ASEP 19§230.413, 1999). It is paradoxical that while there is an increasing need for more certified administrators, the tests are scaled to become increasingly difficult. Universities are under pressure to produce graduates that pass in totality as well as by race and gender subgroups (TAC, ASEP 19§229.3 a,1,A, 1999; TAC, ASEP 19§229.3 e,2,B, 1999).

This study addresses the factors of GRE, race, gender, and undergraduate GPA as predictors of certification examination success at a large urban university. The university has three programs that lead to a masters degree and principal certification. The Regular program consists of students who are not in a cohort. They complete targeted degree plans on individual timelines. The other two programs consist of cohorts of students who progress through concurrent coursework and internships. Students retain their positions as teachers, but are assisted by their district in obtaining over 1000 hours of supported internship experience within an 18-month period. The third program, Educational Leadership, has been in existence for five years. These students are selected by their respective public, private, or charter districts to serve as paid administrative interns for one year.

Objectives or Purposes of the Study

1. Are there significant differences between state principal certification examination scores among students in the Regular, Scholars of Practice, or Educational Leadership programs?
2. Are the variables of race, gender, GRE, or undergraduate GPA predictors of state principal certification examination scores?

Limitations of the study include:

- The lengths of the internships and degree of district support are not factored.
- Whereas scores are studied over a five-year period for the Regular and Educational Leadership programs, the Scholars of Practice cohort has data for only one year. Further, there was only 1 minority student and 2 males in the first cohort.

Perspective(s) or Theoretical Framework

Although there is considerable longitudinal discussion about the validity of the GRE as a predictor of educational administration graduate school success (Lindle & Rinehart, 1998; Wendel, 1991; Nagi, 1975) there have been no known studies of its' use on state licensure/certification examination passing rates for school administrators. The issues of gender, race, and undergraduate GPA further complicate the issue. House's (1998, 1997) studies of GRE and gender found that while the GRE generally was predictive of graduate performance, in a number of cases it under predicted the achievement of female students and over predicted the achievement of males. The work of Lindle & Rinehart (1998) found GRE analytic scores should be given more weight in educational administration admissions decisions. Nearly 30 years ago Nagi (1975) began looking at the validity of the GRE and the Miller Analogies Test (MAT) as predictors of completion of the doctoral program in educational administration at the State University of New York at Albany. Comparisons between the MAT and GRE with educational administration graduate school performance have continued as Wendel (1991) correlated these

with measurements obtained through authentic assessment by the Assessment Center Project of the National Association of Secondary School Principals. This study is necessary to provide equitable admissions, instructional, and support services and to determine if a statistically significant correlation exists between any of these factors.

Methods, Techniques, or Modes of Inquiry

From 1996-2001 over 337 students completed administrative certification requirements at this large urban university.

- An ANOVA with Scheffe's multiple comparisons test was performed to compare the mean examination scores of students per program.
- A computer generated multiple regression analysis using SAS® software was utilized to determine if there was a significant relationship between the GRE, race, gender, and undergraduate GPA in predicting certification examination scores of students per program.
- Ethnic subgroups (Black, Hispanic, Asian, Indian) were combined to make them statistically more robust. The subsequent minority N was 60.

Data Sources or Evidence

Students were disaggregated per program for race, gender, GRE scores, and undergraduate GPA. Demographic data, GRE scores, and undergraduate GPA were obtained from Graduate College records. Examination results were supplied by the State Board for Educator Certification. Scores were disaggregated based on all factors.

Objective 1 Methodology and Results

The mean for each group was computed and compared.

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	981.23552	490.61776	7.93	0.0004
Error	333	20606.71686	61.88203		
Total	335	21587.95238			

R-Square	Coeff Var	Root MSE	ExCET Mean
0.045453	9.730336	7.866513	80.84524

H_0 = No differences among the population means.

H_1 = at least two means differ.

Conclusion: Reject H_0. The p-value is 0.0004 which indicates there is evidence to infer that at least two means differ.

To determine which of the population means differ, the Scheffe's multiple comparisons test was utilized with the following results.

Comparison of Mean ExCET Scores Between Pairs of Groups.

Scheffe's Test for ExCET

Alpha	0.05
Error Degrees of Freedom	333
Error Mean Square	61.88203
Critical Value of F	3.02284

Type Comparison	Difference Between Means	Simultaneous 95% Confidence Limits		
S - C	5.8146	1.0603	10.5689	***
S – R	7.1682	2.6508	11.6855	***
C – S	-5.8146	-10.5689	-1.0603	***
C – R	1.3536	-1.0123	3.7195	
R – S	-7.1682	-11.6855	-2.6508	***
R – C	-1.3536	-3.7195	1.0123	

Comparisons significant at the 0.05 level are indicated by ***.

Objective 1 Conclusions

As indicated by the ***, there are differences in the ExCET mean scores between:

- The Scholars of Practice and Educational Leadership cohorts
- The Scholars of Practice and Regular program
- There are no differences in the ExCET mean scores between the Educational Leadership cohort and the Regular program.

Objective 2 Methodology and Results

Regular Group/Program

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1818.33565	454.58391	11.43	< .0001
Error	122	4851.25490	39.76438		
Total	126	6669.59055			

Root MSE	6.30590	**R-Square**	0.2726
Dep Mean	80.53543	**Adj R-Sq**	0.2488
Coeff Var	7.82997		

A regression model was fit with ExCET scores as the dependent variable. The independent variables were sex, race, GPA, and GRE scores. Indicator variables are:

Sex Female = 1, Male = 0

Ethnicity White = 1, Non-white = 0

Therefore, the regression equation to predict future ExCET examination scores is:

ExCET = 50.33 + 0.42SEX + 1.43ETHNIC + 1.34GPA + 0.03GRE

Results indicate the following conclusions for the Regular group/program

- The F-test in the ANOVA table (p-value) shows at least some of the parameters are non-zero. Therefore, there is a linear relationship between the independent variables on the right side and the dependent variable on the left side of the model.
- Only the GRE variable is significant at the 0.05 level in the prediction equation. Subsequently, when everything else is held constant ExCET scores will increase by 0.03 units for each additional GRE point.

Scholars of Practice Cohort

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	35.71148	8.92787	0.61	0.6638
Error	13	190.78852	14.67604		
Total	17	226.50000			

Root MSE	3.83093	**R-Square**	0.1577
Dep Mean	87.16667	**Adj R-Sq**	-0.1015

Coeff Var	4.39495

Results indicate the following conclusions for the Scholars of Practice cohort:

- Because the p-value is > .05, there is no linear relationship between ExCET scores and sex, ethnicity, GPA and GRE.
- None of the variables are significant at the 0.05 level according to the regression analysis, therefore a prediction equation will not be useful to predict future ExCEt examination scores.
- None of the variables are predictors of the ExCET examination scores.

Educational Leadership UTA Cohort

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	3231.56504	807.89126	20.22	<.0001
Error	91	3635.17454	39.94697		
Total	95	6866.73958			

Root MSE	6.32036	**R-Square**	0.4706
Dep Mean	81.38542	**Adj R-Sq**	0.4473
Coeff Var	7.76596		

A regression model was fit with ExCET scores as the dependent variable. The independent variables were sex, ethnic, GPA and GRE scores. Indicator variables are:

Sex Female = 1, Male = 0

Ethnicity White = 1, Non-white = 0

The subsequent regression equation to predict future ExCET examination scores is:

ExCET =47.81 + 5.06SEX + 3.55ETHNIC + 2.63GPA + 0.02GRE

Results indicate the following conclusions for Educational Leadership students:

- There is a linear relationship between ExCET scores with sex, ethnicity, GPA and GRE.
- If everything else is held constant:
    - A female candidate will score 5.1 units higher on the ExCET than a male candidate
    - A male candidate will score 5.1 units lower on the ExCET than a female candidate
    - A student who is not white will score 3.6 units lower on the ExCET compared to a white student
    - The ExCET score will increase by 0.02 units for each additional GRE point.
- Although GPA is not significant in the model, it is close.
- The adjusted coefficient of determination (R^2) of 45% shows that 45% of the variations in ExCET scores are explained by the model.
- All variables in the prediction equation were significant at the 0.05 level except GPA.

Conclusions for Objective 2

- GRE is a predictor of ExCET scores in the Regular program.
- There are no variables that are significant predictors of ExCET scores in the Scholars of Practice program.
- All factors except GPA are predictors of ExCET scores in the Educational Leadership program yet GPA is close.

Conclusions of the Study

- There are significant differences between the Scholars of Practice and Educational Leadership cohorts in mean examination scores. The Scholars of Practice cohort scored higher than the Educational Leadership cohort.

- There are significant differences between the Scholars of Practice and Regular program examination mean scores. The Scholars of Practice students scored higher than the Regular students.
- There were no statistical differences between the Educational Leadership and Regular students in their examination mean scores.
- GRE is a predictor of ExCET scores in the Regular program.
- There are no variables that are significant predictors of ExCET scores in the Scholars of Practice program.
- All factors except GPA are predictors of ExCET scores in the Educational Leadership program yet GPA is close.

Educational or Scientific Importance of the Study

This research is important because it studies students within the same university who participate in three different preparation programs, but who are measured by the same certification examination. Results of this study indicate there were no significant relationships between the variables of GRE, GPA, sex, and ethnicity in the Scholars of Practice cohort and that GRE is the only significant predictor in the Regular program. However, in the year-long field based Educational Leadership program, all factors except undergraduate GPA were predictors of certification examination results. Further, sex was more significant in this program than the other two. Further research is indicated to determine causes of the discrepancy of predictors between programs as well as to study the effects of the lengths of time spent and amount of district support provided in the internships if other variables are held constant. A limitation of the study was listed as the small number of minority and male students within the Scholars of Practice cohort that could result in skewed results for that program.

This research is particularly significant as:

- The Scholars of Practice program grows and develops,
- Further in-depth analysis towards specific program effectiveness is investigated,
- Strategies to continue to enhance student performance are developed, implemented, and assessed, and
- Universities and alternative preparation programs strive to develop well-prepared and diversified school administrators for the increasing national shortage and the multi-faceted needs of a changing society.

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